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Contents

General Articles :

Symposium on Veterinary Education
V.—Clinical Veterinary Studies 441
Professor W. L. Weipers, B.SC., M.R.C.V.S., F.R.S.E., D.V.S.M.
S. Jennings, M.R.C.V.S.,
VI.—Post-graduate Veterinary Education 444
G. O. Davies, D.V.SC., M.R.C.V.S., D.V.H.
VII.—The Teacher 446
Professor G. F. Boddie, B.SC., M.R.C.V.S., F.R.S.E.
VIII.—Summary 448
Professor L. P. Pugh, B.SC., M.A., F.R.C.V.S.
Laboratory Diagnosis of Dinitro-ortho-cresol Poisoning in Cattle 450
E. F. Edson, O.B.E., M.SC., M.B., CH.B.
M. L. Fenwick, B.A.
The Late Treatment of *Trypano soma congolense* Infection in Zebu Cattle with Ethidium Bromide 452
A. H. Milne, M.R.C.V.S.,
J. Robson, B.SC., M.R.C.V.S.

Current Literature :

Book Reviews 453
Abstract 454

News and Comment 455

Correspondence :

Furazolidone and the Control of Blackhead in Turkeys ... 458
C. Horton-Smith, PH.D., B.SC.
P. L. Long, A.I.M.L.T.
Enzootic Haematuria of Cattle 459
George Shenman, B.V.SC. (SYD.)
Glycine-Egg-Yolk Semen Diluents 459
Marcus W. H. Bishop, M.A., DIP. AGRIC. SCI.
Eosinophilic Myositis in the Dog 460
H. P. Harding, M.R.C.V.S.,
L. N. Owen, B.V.SC., M.R.C.V.S.
R.C.V.S. Council Elections ... 460
J. B. White, M.R.C.V.S.
H. M. Wilson, M.R.C.V.S.

SYMPOSIUM

Veterinary Education

W. L. Weipers & S. Jennings : G. O. Davies : G. F. Boddie : L. P. Pugh

V—CLINICAL VETERINARY STUDIES

BY

W. L. Weipers & S. Jennings

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MANY of the words used in veterinary medicine have been transferred directly from human medicine, and the term "clinical medicine" strictly speaking means "bedside medicine." We are not perturbed about the root meaning of the word and define it as instruction in close conjunction with the sick animal, not merely in the presence of the sick animal. Clinical instruction can degenerate into leaning on a cow and talking about sheep, or talking solemnly about pigs in the presence of horses.

We are not suggesting that clinical instruction should be confined to one species at one time. There are many advantages in using more than one species in the same clinical demonstration, and there can be benefits from making comparisons on the impact of the same pathogen on different species, pointing out variations which often help to fix facts in the student's mind. This can be useful in what we describe in the Glasgow School as a "polyclinic." If students are familiar with clinical material from only one species they expect the same reactions to a lesion in other species. Thus it is possible to see a student thinking in terms of a dog and trying to interpret his thoughts in terms of the large animals.

In this School we have accepted that the maximum that can be done in a five-year course is to give the necessary instruction in all the subjects that compose the veterinary curriculum, with the object of making an undergraduate into a veterinary clinician. In the process of doing so he will acquire a sufficient knowledge of the component subjects to act as a foundation for post-graduate instruction and specialisation in any branch, and he will have a sufficient knowledge of preventive veterinary medicine to allow him to become established as a practitioner. A student can only become a sound clinician if he understands the underlying pathological processes that give rise to the clinical signs and if he is, in turn, capable of recognising these and of making a diagnosis. This is one of two aspects of animal work that are reserved solely to the profession in The Veterinary Surgeons' Act 1948. The other is treatment. We think it important to define exactly the meaning we give to the words "practitioner" and "clinician." A good practitioner is someone in practice ; he must be a good clinician, but it is appreciated that in a modern veterinary practice he will

devote much more of his time to applying the principles of good husbandry and preventive medicine than he will to purely clinical work. A good clinician is one who is capable of arriving at a diagnosis on all the evidence available, through history, clinical signs, information from ancillary aids and by understanding the underlying pathological changes, and is able to give a prognosis. The unique quality we have which distinguishes us from other scientific workers is that capacity to estimate the presence of disease during an animal's life. If our graduates had not this quality there would be no reason for their selecting certain types of veterinary work in preference to other scientifically trained workers, such as bacteriologists and zoologists.

Criticism is sometimes made by the veterinarian who is working on the broad field of agriculture—say those working with F.A.O. They are preoccupied with the problems of the underdeveloped country where epidemics are rife and great economic loss is associated with bad husbandry and poor agricultural practice. Some of these workers maintain that a larger part of the time in the veterinary curriculum should be devoted to animal husbandry. Those of us who are engaged in veterinary education would in no way minimise the importance of these diseases and the necessity for instruction on programmes for their control in the schools, but we appreciate that this type of instruction is so much easier got over to the student than is instruction in clinical veterinary work. The former can be done with students in large classes, but the latter only with small groups of students. It will be a bad day for the profession when we begin to consider that training our graduates as clinicians is not important. This aspect of veterinary activity is the *raison d'être* for our profession.

Methods of Imparting Clinical Instruction

Clinical instruction can only be given to small groups of students, probably five, six, seven or eight. Prior to 1949 most students received the larger part of their instruction in clinical work from a private clinician during the statutory period of six months "seeing practice." We think this old regulation of the Royal College was an extremely important one and contributed much to our profession in this country. We would not hold a brief for the system *per se* but, combined with clinical instruction in the Schools, it performs a very useful purpose and it is significant that most of the Schools, in formulating their Ordinances for veterinary degrees, have made a six-monthly period seeing practice a statutory requirement.

It is interesting to look briefly at the methods used in providing material for clinical instruction in other countries. In the United States during the 1920s and 1930s many of the State Veterinary Schools in the A. and M. Colleges developed ambulatory clinics which were usually run in conjunction with a veterinary practice owned by the college. The Professor of Medicine frequently had responsibility for running these clinics. Four or five students went with the Professor, or more often with one of his assistants, to the farms to examine and treat cases. It should be realised that the total instruction received at an ambulatory clinic by any one student in any one year is necessarily quite small where groups of five and six operate and classes run to 50 and 60. In some of the Schools, Directors of Clinics were appointed. They were often given assistants where three or four ambulatory clinics were run, and often these were fairly junior people.

If there is any criticism of the method this would probably be the most important one because instruction in these circumstances would not differ markedly and would certainly not be better than that given in this country to a student seeing practice with a good practitioner. The ambulatory clinic has been used a good deal in the United States and in Canada, in Australia and on the Continent. At Utrecht an area of free practice is reserved around the town for the college, and in Stockholm, in Oslo and in Hanover, and in a number of other continental Schools, comparable arrangements are made. In the United Kingdom two of the Schools own practices, and these are used in part in the manner of ambulatory clinics. It is our opinion however that in no case does this use contribute a major portion of the clinical instruction received by the students at the School. In Glasgow we have an arrangement whereby three of our students go in the afternoons in their final year with one of our part-time clinical instructors to the farms of the Corporation of Glasgow, and while this is a useful arrangement, we appreciate that it supplies only a small part of their clinical work.

Where Schools depend on the running of an attached practice, a great deal of routine time is taken up with this work and out of term the staff are almost as busy as at other times. This seriously impedes the possibility of the staff doing private research and increasing the tempo of this research during the vacation. This must be very true of a small animal practice attached to a college. In the running of the Small Animal Clinic here, we find that many cases are admitted into the hospital, not because such a course is essential for the good of the patient, but because it is desirable for the students studying these cases. Thus during the vacation, a much smaller number of animals can be carried in the hospital which contributes materially to its economic running.

Practically all the veterinary schools in this country have hospitals for housing and treating all types of animals, and we are convinced that this is the most practical way of having clinical material at hand for teaching. The problem of feeding a hospital with cases is quite a serious one. Those Schools with practices might hope to use them as feeders; other Schools depend on consultation cases; others again have a modified type of practice where the staff have accepted responsibility for several large farms. Some of the Schools run small-animal clinics; others get material from clinics run by the staff for the treatment of poor persons' animals.

Costs in running a hospital are of paramount importance in this country. In some of the continental Schools the head of each clinical department has a fixed sum which he may spend providing clinical material. This may either be used in the purchase of interesting cases or in the maintenance of these over a period. In addition to admitting in this School consultation cases and animals from several farms,

we also purchase animals in the market, particularly the the type in the category of wasting bovines. With care a relatively small sum can purchase a large number of animals when maximum advantage is taken of the salvage of these animals. As a considerable quantity of dog food must be purchased for the small animal in-patients in any case, it is not difficult to make arrangements with a butcher or a knacker that can be advantageous in providing clinical material. This source of teaching material can again be turned off like a tap at the end of term.

Clinical material that comes from a consultation practice entails constant attention, for unless one is willing to take consultation material at any reasonable time, it will not be available when it is requested during term.

With the type of material that goes into most veterinary hospitals a difficulty arises in that much is preselected and not entirely representative of the range that will be found in practice. The nature of the material tends to be conditioned by the interests of the teaching staff of the hospital. A hospital run by an eminent surgeon tends to attract only surgical cases ; if a medical teacher is interested in one particular field of disease practitioners tend to send him cases coming within that field. There are practically no limits to the intake of surgical cases, but there are many in relation to medical cases. It is difficult to get cases of metabolic disease and infectious disease in a hospital, and we know of no satisfactory answer to this problem apart from the School owning a limited practice or accepting responsibility for some large herds in the area.

A disadvantage of a hospital is that once the animal has been removed from its original environment a large amount of valuable information, and therefore teaching material, has been lost to the case. This information is that on which the diagnosis is partly based and is often a summation of all the facts which have to be drawn from a farm servant with the skill of a Sherlock Holmes. There is the condition of other animals on the farm, the state of hygiene, the type of pasture, the mentality of the owner, the presence of disease in the other animals, all of which are an essential part of the teaching material. An investigation into a case of poisoning in a flock or herd, or the investigation of herd infertility will serve as two examples of many where the hospital is of little value.

We do not think the problem of veterinary clinical teaching has been solved anywhere and we certainly do not think we know all the answers ; but it might be of interest to review our methods in Glasgow at this point.

We feel it is an advantage to start students in their clinical instruction very early in the course, and we start in the eighth term at the same time as the student starts to study pathology. He learns methods of physical examination and an attempt is made to get him to become familiar with the clinical signs which will allow him to understand the underlying pathological processes that are taking place in the animal. This type of instruction goes on during the remainder of the third and fourth years being considerably increased in the last term of the fourth year, after the student has sat the examination in the pathology group. The final year is an intensive year, and the students working in pairs are given responsibility for two or three cases during the week and can devote a large part of their time to these cases. In the final year lectures never occupy more than two hours daily and more often only one hour. The student is given the opportunity of examining his cases clinically and using ancillary methods of examination. He then attempts to reach his diagnosis and make a prognosis and from time to time his findings are checked by a senior clinical instructor. Once or twice a week a clinical conference is held at which students or staff present cases to the final year (both staff and students). Whenever possible students attend operations on their own cases and special examinations like X-rays, endoscopy, etc. They have special responsibility to these cases in relation to treatment and attend *post-mortem* whenever possible when a case terminates fatally. They also have access to the reports on the histopathology, biochemistry, haematology, etc. in relation to their own cases and make their own records. We think the opportunity for correlating clinical findings with pathological process can be more fully achieved in this way.

A criticism that is sometimes levelled at this type of approach is that the student becomes too hospital minded, that the method is tedious and that it is only possible for him to see a relatively small number of cases. We are convinced that it is better to examine 10 cases fully than to see 100 cases, even if these are much more varied, but where the penalty would be that only a short scrutiny was possible. Practitioners are often afraid that a student trained in this method will be little use for practice where opportunities for ancillary tests and protracted observation are often not available. We do not consider this important as once a man has learned the significance of physical signs, he will often be able to dispense with ancillary aids to interpret them. The famous Scots cardiologist, Mackenzie, who added so much new knowledge to diseases of the heart, acquired his special knowledge by the use of recording drums, tambours and the prototypes of kymographs. After practice with these new methods, he found he was able to dispense with these aids and by physical examination alone, he was able to diagnose conditions that had not previously been recognised. The same argument applies to the acquisition of clinical knowledge by students.

It has been suggested in the past that a knackery would be a useful adjunct to a veterinary school ; certainly close collaboration with a knackery is most useful. An arrangement of this kind in Glasgow provides a useful source of figures in relation to disease incidence, and also teaching material. It is always a most salutary experience for a clinician to follow his fatalities to the *post-mortem* room.

For our instructions in the equine species, apart from consultation cases in the hospital, members of staff are able to attend with groups of students at the stables of British Railways, those of the police, and a riding school.

Access to several large farms provides opportunities for rectal manipulations, and a particularly useful amenity is that of an abattoir where rectal examinations can be made in cattle just prior to slaughter. In

Glasgow we are also sufficiently impressed with the importance of clinical work that we fail any student who does not pass the clinical part of his final examination.

We must apologise for having removed the latter part of this discussion from the general to the particular, but inevitably our point of view in relation to the provision of clinical material will be conditioned by our experiences here.

While we consider this subject most important we should not take ourselves too seriously in relation to our impact on students. Most of us here have graduated from the benighted generations which received little academic clinical instruction, and we appreciate that in any sphere of human activity opportunities will develop men no matter how poor their early tuition had been ; and that the relative indifference of students to their environment, while sometimes preventing their gaining the maximum benefit from their studies, must also protect them from forces which might not always be beneficial.

VI—POST-GRADUATE VETERINARY EDUCATION

BY

G. O. Davies

University of Liverpool Veterinary School

IN the course of the extremely interesting papers which were presented to the Association of Veterinary Teachers and Research Workers at Leahurst in January and the discussion which followed, one of the salient points which emerged was the anxiety felt by many contributors at the steady increase in the amount of material which the present-day undergraduate is expected to assimilate. This of course is nothing new, as this danger of overburdening the student is a perennial problem to all those concerned in undergraduate education. Not only is it essential to keep the subject matter of each course under constant review, but every few years it is imperative that Faculties and Boards of Studies should consider the curriculum as a whole so as to ensure that it is not becoming unbalanced and that matter is not being introduced which is unnecessary in an undergraduate course.

Progress, however, is inevitable, and with the ever-increasing additions to our knowledge there comes a time when simple pruning fails to solve the problem. How then are the schools to meet this difficulty?

Many of us who are responsible for advising universities view with alarm any suggestion that the course of study should be lengthened. On economic grounds, it might prove a serious deterrent to prospective students, particularly at the present time when Parliament compels recent graduates to undertake National Service. Under present conditions, most of our graduates are at least 25 years of age when they commence their professional career. Furthermore, I am not at all sure that a good case can be made out for lengthening the curriculum of all students, as I still think we can provide a sound training in the fundamental principles of the various subjects provided they are not overburdened with detail.

In our own field, we have the example of the way in which teaching of microbiology (bacteriology) has attempted to cope with the position. Twenty to 30 years ago, it was possible to give the student a course of lectures and practical classes in which he was made familiar with such aspects as media preparation, the details of the identification of bacteria in culture, the technicalities of serological diagnostic methods, etc., so that in the event of his deciding to follow a research career immediately he qualified he was already partly equipped with the necessary technical knowledge. As the years have passed teachers have, quite rightly, tended to concentrate more on the basic principles of disease processes. But the outcome of this is that the newly qualified graduate is no longer fitted immediately to follow a research or academic career and is now much more in need of a post-graduate course than was the case 20 years ago, particularly if he intends pursuing a career in the field of microbiology.

So also in other subjects ; as courses are designed more and more to cater for the needs of the general student, so does the need for further training become essential for our potential teachers, research workers and those engaged in public health and disease control.

It must not be assumed, however, that no preparation is possible during the years of undergraduate study. But, holding as we do the view that it is the duty of the universities to produce graduates who have a sound basic knowledge in all subjects, we feel it would be a great mistake to make, as has been suggested, a division in the later stages of the course, relegating to one section those who expect to become practitioners and to another those whose purpose in life is to undertake teaching and/or research.

It is possible, however, by interpolating within the undergraduate course an additional *optional* period of study to provide the means whereby a student may receive instruction to an advanced level in some subjects. Some schools have already instituted Honours courses entailing as a rule an additional three terms' study of a particular subject. Thus, *selected* students have been encouraged to take Honours physiology immediately following their undergraduate study of that subject, and this method could probably be extended to such subjects as anatomy, biochemistry, animal husbandry and possibly pathology. The advantage is that, provided the student can secure additional financial assistance, he is much more likely to seize the opportunity of studying a particular subject to a higher level during his undergraduate course than after graduation, when economic pressure may urge him to apply for a salaried post under conditions which preclude him from obtaining formal instruction of a similar type. This is a solution which I think merits further examination. I have some doubts, however, whether a student can make full use of such an Honours course in all subjects, *e.g.*, pathology, microbiology and animal husbandry, before graduation, as I think clinical knowledge is very desirable for the maximum advantage to be derived in these subjects.

There is also the problem as to whether graduates who wish to devote themselves to teaching or research should be advised to spend a short term in a veterinary practice before their post-graduate study. Of course

it is desirable, but does it come within the realm of practical politics when we realise that the graduate is already at least 25 and has yet to undertake his post-graduate study? Obviously no definite answer can be given to this question, but in view of the many branches of the profession who are engaged in whole-time activities which bring them into close touch with veterinary practitioners, *e.g.*, research workers in university departments, in the Central Laboratory at Weybridge, in the V.I.O. services, veterinary advisers to commercial farms, etc., it would seem to me that some experience of the problems of general practice must be of value in enabling the point of view of the practitioner to be appreciated in the laboratory. In stating this view, one must not lose sight of the fact that once a graduate leaves the laboratory bench a return to the research field may thereby be rendered more difficult and a good potential research worker may be lost. Perhaps a more satisfactory way of acquiring practical field experience would be for the graduate to spend his long vacations in the course of his post-graduate career in general practice. This he could do without any sacrifice of time and with considerable benefit, financial and otherwise to himself.

Having emphasised the special need for the further training of graduates who intend to follow academic research or other specialist careers, which inevitably arises from the pruning of undergraduate courses, let us now consider the nature of such courses, other than those in such subjects as physiology, biochemistry, etc., which can be interpolated in the undergraduate curriculum.

The Royal College has, in my view, performed a most valuable service in instituting and maintaining the examination for the D.V.S.M., and so also have such schools as Edinburgh, who have played such a leading part in post-graduate training. The formal instruction enables the undergraduate training in certain of the disciplines—microbiology, epidemiology, milk and meat hygiene—to be consolidated, and the compulsory period with outside bodies gives it the necessary practical flavour. I would emphasise, however, that excellent though the course may be for those whose career lies in the field of disease control and animal health, it is not a suitable post-graduate course for those whose future lies at the laboratory bench. They would be more profitably engaged in some other training where the microbiology course follows a different pattern. Unfortunately, at present, there is a tendency on the part of graduates to regard the D.V.S.M. as a suitable post-graduate preparation for all spheres of activity.

The needs of the research worker in microbiology are best catered for by the courses of study provided by the Universities of London and Manchester leading to the Diploma in Bacteriology. These have long been open to our students. It is my belief that courses of this type give the soundest foundation on which to build a research career because they are deliberately designed on broad lines and compel the student to perform for himself those techniques which later in his life will be undertaken by technicians under his control. Such training is essential if we are to maintain our status in the scientific world. I see no reason, however, why our veterinary schools should not equip themselves to run suitable courses of their own. I do not wish to convey the impression that we could run courses any better than those already available, but we must not overlook the fact that the number of places open to our graduates is very limited and these are not sufficient to accommodate those who should be taking them. In pathology, parasitology, animal husbandry, etc., there are no such facilities as yet, and I think it is high time that we as a profession considered ways and means of rectifying these deficiencies.

Before such courses can be contemplated, several fundamental points require to be settled.

1. The provision of staff for the purpose. The staffs of the existing schools have, in general, been increased to a level satisfactory for undergraduate teaching and to permit a measure of personal research. I doubt, however, whether they could attempt to undertake the intensive courses required for post-graduate instruction without the creation of specific posts for the purpose.

2. More financial assistance should be made available to enable promising graduates to undertake such courses. Each year there are fewer students who can afford to forgo a salaried post on graduation to follow such courses.

I think the University Grants Committee, in so far as staff is concerned, and the bodies which award scholarships in so far as students are concerned, must face up to these facts. If these two essentials can be solved, the way is clear for each of the schools to develop the particular line of post-graduate study for which it is best suited and equipped. There should, however, be no duplication of courses; one school should concentrate on bacteriology, another on pathology, a third on animal husbandry and possibly state medicine, and others on clinical medicine and surgery of the different animal species. That, however, is for the future.

Until such time as these developments come into being, we must continue to rely on the facilities at present available to our new graduates. Let us consider how far these can be regarded as satisfactory. At the outset, I must say that it is very gratifying to find an increasing number of grants now being made available. In view, however, of the steady expansion in our research services, I doubt whether the number available is yet adequate to meet present needs.

One of the advantages of a post-graduate research scholarship is the relative freedom which it gives to the holder to decide how he shall train himself. Three courses are open. Some scholars choose a set course of post-graduate instruction. Others use the grant for travel in this country and abroad where they will gain research experience. This latter course is often of limited value as the advantages which accrue are so often determined by the research experience which the holder already possesses; with an insufficient background, the time thus spent may be a waste of effort. The majority, however, tend to take up a specific research problem to which they devote the whole of their energies. This, too, I think is often mistaken policy as the benefit to be obtained is entirely dependent on the training and assistance which they receive from the more senior workers in the institute where research is being pursued.

We must not lose sight of the fact that the newly qualified graduate has at most spent four or five terms of study on any one particular subject. Surely nobody would claim that such a person has received adequate basic training to enter a restricted field of research. If we teachers are required to prune our undergraduate courses, then it becomes essential for those who wish to become pathologists, bacteriologists, etc., to devote further time to perfecting their technical equipment. As yet they have no "tools" with which to work. I think the research institutes who appoint the present new graduates to their research staffs do them in the long run a disservice. They are more likely to "break" rather than "make" good research workers. Too often have I met young graduates who have chosen to plunge into research, probably for a post-graduate degree, who were frustrated because they had become submerged in the complexities of a subject in which more senior workers have been floundering for years.

Far better that a scholarship or grant should be devoted to post-graduate training. As the next five years will see the virtual extinction of the non-university graduate, all those who qualify will have university degrees and so will be eligible to study for higher degrees. Such an opportunity could well, if properly used, fit them for academic or research life.

Unfortunately, this is not always the case. A graduate may acquire a high university degree for work of a specific nature without its necessarily being a hall-mark of ability to do original research of a high order.

The fault resides in the narrowness of university regulations for higher degrees. Usually in order to satisfy university requirements, the candidate must state precisely the subject of his research and cannot deviate therefrom. It would be better, in my opinion, to permit greater latitude to Heads of Departments and Supervisors to direct such students into suitable channels as their work progresses, so long as they do not become butterflies flitting from one problem to another without making a solid contribution to any one. As I have suggested earlier, at least 12 months should be devoted to a systematic study of their subject and perfecting their techniques. In this way, training on broad lines would be possible and there would be less tendency for these research exercises to run in narrow channels merely to meet degree requirements. If the acquisition of the degree becomes the overriding consideration, there is a great danger that it will be regarded as a means to an end.

The Royal College has still a part to play in post-graduate research. I am given to understand that the regulations for the Fellowship thesis have recently been recast in an effort to stimulate more practising veterinary surgeons to work for the Diploma, and I would like to see the Fellowship reach such a plane of distinction as to make it worthy of acquisition, particularly by those in the field of clinical studies.

Time will not permit me to deal with the need for training in tropical medicine for graduates going abroad. This is a vast problem which I believe is exercising the mind of the Council of the R.C.V.S. Suffice it to say that there is a growing belief that facilities should be provided for the training of British graduates to fit them for overseas conditions and, at the same time, to offer facilities for Commonwealth, Colonial and other veterinarians who would wish to come to this country for training and research.

In conclusion, may I re-emphasise the following points. No lengthening of the undergraduate course should be considered. The course should be devised to provide the fundamental training for all students, no matter what their future sphere of activity may prove to be. As this inevitably involves pruning of "frills" in all subjects, those students who wish to pursue an academic or research career, or who wish to make themselves better qualified in the sphere of animal health or clinical work should receive additional training. This in some subjects, *e.g.*, physiology, anatomy, etc., may be interpolated in the under-graduate course, but in others must take the form of post-graduate study. For this purpose, further scholarships, fellowships or grants should be made available. In some subjects, the post-graduate student should read for a higher university degree or a post-graduate diploma, and in the field of clinical studies the diploma of F.R.C.V.S. might well meet this need.

It is important, however, that there should not be any duplication of courses. Schools should be encouraged to develop their own post-graduate courses, and it is suggested that this may be best achieved by setting up a committee composed of representatives from all the schools to discuss how best to organise post-graduate training, bearing in mind the facilities and staff available in each centre.

VII—THE TEACHER

BY

G. F. Boddie

University of Edinburgh Veterinary School

I MAY claim to have some right to speak on this subject for I have spent the last 25 years teaching—or attempting to teach—veterinary medicine.

It has been impressed on me that there are certain qualities, among the many that are essential, if teaching is to make a successful impact on the student mind. First of all, I think I would put vitality. And here we must make a very clear distinction between vitality and flamboyance. Flamboyance masquerading for vitality will soon be detected by the average group of students. Flamboyance in teaching may make a temporary appeal but students very soon tire of the theatrical because fortunately for their teachers the vast majority of students are earnestly seeking knowledge.

Now vitality in teaching springs from two things, first that the teacher is interested in his subject, and secondly that he has sufficient mastery to deal with it lucidly and concisely. One of the greatest advantages of veterinary education passing into the broader realms of university life is that the teacher has greater freedom within his own subject and so his interest in the subject is given free reign and from that there can spring the quality of vitality. It has been a great thing for veterinary education in this country that the dead hand of uniformity has been removed. Nothing was more calculated to depress vitality in teaching than the

uniformity imposed by a peripatetic examination board which governed the curriculum by the range of its examination questions. Surely it is better to live freely and courageously rather than to try and find virtue in the mere observance of rules.

Next in importance I would place integrity in teaching. By this I mean a frank presentation of the subject. When there are gaps in knowledge these should be indicated and when something is not known this should be stated clearly and no attempt made to gloss over with a spate of verbiage. This I regard as of great importance, because integrity in teaching will inevitably be reflected in the student's attitude to his work both as an undergraduate—and perhaps even more vital—in the continuance of this attitude throughout his professional life. I believe the example given by vitality and integrity in teaching will have far greater and far more lasting effects than preaching. Students quite rightly do not like being preached at, but they are ready to follow a lead.

Then a sense of humour is indeed a blessing, not least of all to see a joke against oneself, for it enables a class to realise that the teacher is human and this makes for that intimate contact between teaching and class that is one of the true rewards of teaching, and incidentally makes an important contribution to successful teaching. Laughter has been described as the essence of democracy; it cannot be taught, it cannot be commanded. It is an individual thing, an intricate thing. And this tempts me to make two assertions with which you may not disagree. No one ever raised his dignity by standing on it. It is a poor teacher who cannot learn from his students.

Good teaching is the first step towards the advancement of knowledge. While advanced study with a view to the promotion of knowledge is an essential part of any teacher's life and work, it should not be allowed to develop to the point of excluding adequate fulfilment of teaching duties. But we must remember there is no finality in education—we cannot stand still in such matters.

It has impressed me very strongly that the most senior teacher in a Department should deal with the most junior students. He, with his experience, should be the best equipped to lay the foundation of knowledge of a subject on which the student can build the superstructure and fill in the finer details with the aid of the other members of staff in the Department. Naturally, the head of a Department will also interest himself with the final stages of his undergraduate course and will concern himself with post-graduate and research students. It follows that one of the most important functions of a senior teacher is to build up the staff of his Department with individuals on whom he can depend and to whom he can delegate duties.

There are many reasons why this building up of staff is important.

The discussions that take place among the staff are a useful stimulus to each and every individual and are complementary to the stimulus provided by the students. Then the teacher's job is to encourage students to think in regard to the subject matter of the course and, as someone said recently, not only to teach them to think but to teach them to think correctly. Having broken free from the dead hand of uniformity, it is now possible for Departments to develop their teaching along the lines that come naturally and spontaneously to them. I think we can go even farther in that the teaching should encourage the student with individuality to pursue his own lines of thought and reasoning. This will mean that there are differences between the graduates from individual schools and that there are differences between individual graduates from any one school. Surely that is all to the good. We don't want each new graduate to be a replica cast from some rigid mould.

Another important feature of this process of building up staff is that through time we shall see promotion not only within the Department of any one school, but also by migration to the corresponding Department in another school. This will lead to a healthy exchange of ideas, if you like, a transfusion of new blood. Already we have had some experiences in Edinburgh of members of staff migrating to other schools. Admittedly, one experiences a feeling of regret, perhaps even of momentary annoyance, at losing a valuable member of staff, but after all a Department is achieving one of its purposes if members of the staff are considered adequately equipped to merit promotion to comparable Departments elsewhere.

It seems to me that any Department should be so staffed that if any one individual drops out by reason of illness, retirement, promotion or death, the Department can still continue to function effectively.

The choice of persons for appointment is always difficult, for, in addition to academic and scientific qualifications, it is necessary to consider the personality of the applicants. I can best sum up what I mean here by saying that any teacher is a cog in a machine and that if the machine is to run successfully it is dependent on the effective functioning of each and every cog to ensure smooth running.

The training required by teachers in veterinary schools varies a good deal with the subject. In the earlier pre-clinical subjects we may in time come to look for a higher degree as evidence that the necessary post-graduate qualifications have been secured. In the clinical subjects we must perhaps place more value on clinical experience that will provide the essential background that the teacher must present to students.

Whatever branch of veterinary science a graduate may elect to enter, clinical training is a good discipline, for surely clinical diagnosis consists essentially of observation and analysis. The training in clinical methods must surely help in equiping the individual to cope with the intricacies of any of the other subjects in the curriculum. Frankly, I fear the results that would accrue were we to adopt the suggestion of dividing the course at the end of the pre-clinical studies to provide for specialisation in the two main branches, namely, applied science and clinical work. The would-be scientist would lose much by such a plan and so too would the potential clinician.

One useful function the clinical teacher can perform is to protect the student against becoming too gadget-minded. There is a great risk of students and new graduates rushing into using aids to diagnosis such as X-rays, electrocardiographs, differential blood counts, and biochemical investigations. These aids to diagnosis

are very useful in their proper place, but quite often their use is unnecessary if the animal is subjected to a thorough clinical examination. Often, too, the results of these aids to diagnosis are quite unintelligible unless interpreted in the light of information provided by the clinical examination. So one of our endeavours must be to keep the student's feet on the ground, which is not a bad thing in any subject even in philosophy and theology.

Teachers should not be cloistered; the senior teacher in a Department has a responsibility to his Department and his school to act as an ambassador. This he does by attendance at meetings of Faculty and Senate. He should also take part in the affairs of the world in general for thereby he is acting as an ambassador for his profession, his university and his Department.

Finally, may I say this: one of the great joys of teaching is the easy friendly relations that develop between teachers and students when things are running properly. And therein lies the whole secret of a teacher's approach to his chosen task. Surely—there is more in teaching than merely imparting a certain stipulated amount of knowledge on any subject as laid down in a curriculum? I have sought for words that would convey to you my thoughts on this point and I do not think I can do better in concluding than to quote you one of the sonnets by Robert Bridges.

> Who builds a ship must first lay down the keel
> Of Health, whereto the ribs of mirth are wed:
> And knit, with beams and knees of strength, a bed
> For decks of purity, her floor and ceil.
> Upon her masts, Adventure, Pride and Zeal,
> To fortune's wind the sails of purpose spread:
> And at the prow make figured maidenhead
> O'erride the seas and answer to the wheel
> And let him deep in memory's hold have stor'd
> Water of Helicon: and let him fit
> The needle that doth true with heaven accord:
> Then bid her crew, love, diligence and wit
> With justice, courage, temperance come aboard,
> And at her helm the master reason sit.

VIII—SUMMARY

BY

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THE various opinions put forward by the essayists in the symposium on Veterinary Education have so obviously been deeply considered and weighed carefully in the light of long experience, that I felt somewhat diffident in drawing any distinctions which might possibly be construed as invidious. If therefore, in summarising some of my impressions of the essayists' meanings, you should consider my remarks biased in one way or another, you must please forgive me, because it will probably mean that they were influenced more by my own inclinations than by my judgment.

I will start by saying with complete confidence that all the speakers appeared as one in their desire to discover the best ways of reorientating veterinary education as a result of its being transferred to the universities. To implement this they all expressed their preparedness to change from the old-established methods of teaching that resulted from the one-portal system of examinations to a more flexible system in which the internal examiners would play an important rôle. There was on all sides an obvious readiness to adopt new ideas to further the better teaching and understanding of modern veterinary medicine, although it was in the methods suggested to bring this about that there appeared some divergence of opinion.

It would seem convenient to consider the summary under three headings (i) the student, (ii) the curriculum, and (iii) the teacher.

The Student

Professor Wright and Dr. E. L. Taylor divide students into two main classes of unequal proportions. The majority, constituting some 75 to 80 per cent., belong to a class of student who appear to be mainly activated in their work by a desire to acquire a vocational training and not by having, as Taylor says, "an inborn interest in learning and a desire always to be acquiring more understanding." Wright says of this class that the majority do not lack natural ability, but are, on the other hand, rather deficient in that quality or character which would impel them to get down to consistent study. They have difficulty in balancing the natural distractions of youthful student activities against the mental efforts required for consistent study. They certainly enjoy life, and, putting aside the fact that they fail to pass their examinations on one or more occasions, they ultimately qualify "to inflict themselves on an unsuspecting public," as Professor McQueen used to put it. This, of course, is unfair to many in this category, because the student who has entered fully into university life generally becomes "a good mixer," and, as such, is usually a success in practice. On the other hand, it is among the 20 per cent. minority that the more original and fertile brains are found. At interview these students reveal traits that may give a clue to their potentialities: good scholastic reports are usual; they have enjoyed reading good literature or history; they may have been fascinated by odd hobbies or intrigued by philosophical discussions. They have, in fact, shown an urge for acquiring that knowledge and understanding to which several speakers have referred. It seems fairly certain that the ability to think clearly and logically, together with the power to express themselves intelligently to others, result more frequently from their early school days than from any other period of their lives. Wright and his selection committee—university tutors and the like—try to discover these traits in an applicant, because they realise that the young men showing them will graduate without difficulty and may well bring credit to their university. Moreover, these students seem impelled even after graduation to go on learning during their subsequent careers, by reading and experience. They are eminently suited for academic or research activities. The question naturally arises how one can best help this type of student to reap the maximum benefit during his university training. Taylor and others strongly advocate the interspersing

of an honours degree in some subject such as physiology. This is comparable in many ways to taking a Part II Tripos. In selected cases this is certainly an excellent thing and financial grants to facilitate the taking of such courses should be more strongly supported than they are at present. Frankly I believe that members of this minority class would succeed in any case, but it is our duty to try and "spot" these men and foster their activities by showing interest in their work. It is a sad reflection on present-day legislation that it is not necessarily the lad with the best brain who is helped in his career by scholarships, owing to the anomalies that arise in the application of the means test to the parents of boys who have won major county scholarships.

As teachers we naturally would prefer to deal with this group but, of course, we must plan for the majority as well. In doing this we should be careful to avoid, as far as possible, stultifying the efforts of the minority by teaching down to the group that is more interested in vocational ends. It is essential, therefore, in planning the curriculum, to see that it is very elastic and on a broad basis. This will allow not only greater freedom for experiment in teaching, but will enable the more industrious students to read more widely and in such directions as their interests may lead them.

It appears that most of you are agreed that the curriculum constitutes the core of the problem of veterinary education. Also that the curriculum must limit its aim solely to the laying of the foundations for a veterinary career without any attempt at specialisations. The curriculum should *not* be one concerned with presenting a mass of factual data but one that indicates the scope, potentialities, duties and responsibility of medicine in its broadest sense, curative and preventive. Professor Lovell said: "It is our job, so to fit our graduates that they may profit adequately from further study and experience." This surely sums up our aim in this connexion.

The importance of "understanding" medicine as opposed to the memorising of facts seems to be brought out well in your deliberations. How best, then, can we implement this conclusion? There is some diversity of opinion as to how we should set about the job and by what methods, especially when we come to deal with the clinical subjects of pathology, medicine and surgery. Professor Ottaway said: "It is probably within the realms of the biological sciences, with which the universities are very familiar, that the greatest opportunities and values are presented for exchanges of procedure and experience, both in teaching and research." With this view some of you agree. I would like to go even further and say that until the paramount importance of the undergraduates' understanding of both functional anatomy and comparative physiology is recognised by them as absolutely essential to their later studies, veterinary clinical studies will never acquire recognition by the universities as a clinical science. It is unfortunately true that the majority of students think that the real business of veterinary medicine only starts in the clinical years—in the hospital and in seeing practice—and that the basic disciplines of anatomy and physiology are simply time-consuming and almost profitless mental exercises—just fences to be taken before useful veterinary studies can be started. This unfortunate impression can probably be overcome to a certain extent by a constant stressing during the pre-clinical years that disease is simply a deviation from the physiological normal and that a lack of knowledge or understanding of this normal will inevitably result in a poor understanding of pathology and medicine. Ottaway and Weipers have emphasised that these basic disciplines should be dealt with by the veterinary-minded—preferably by qualified veterinarians. They are better able to illustrate, by reference to clinical pathology, how the physiological merges into the pathological. If ruminant physiology is taught by a veterinarian, how very much more interesting can the consideration of rumen function be made if such conditions as bloat, ketosis and reticulitis are used to illustrate aberrations of digestive functions. The non-veterinarian is unlikely to use such examples and an opportunity is missed to emphasise the connexion between physiology and medicine.

Although the speakers did not raise the point, I think the proper understanding of physiology also gives the knowledge that is so essential to the correct comprehension of pharmacology. It is probably true to say that, excluding the antibiotics, we could scrap 75 per cent. of what used to be taught under the title of materia medica. Provided the principles of basic pharmacology have been well taught, the student should be able to bring a critical mind to bear on the claims of the vast number of new preparations with which the market will bombard him. Beyond this we should try not to burden the student's mind with factual details, all of which can be obtained at any time by reference to the Veterinary Codex or to text-books on medicine.

All speakers are agreed that the supply of clinical material is one of the main problems of the veterinary schools. Having acquired the material, there arises the question of how best to deal with it. Professor Weipers says: "It will be a bad day for the profession when we begin to consider that training our graduates as clinicians is not important." Professor Boddie, likewise, is equally emphatic that clinical training is a good discipline and strongly deprecates any suggestion of dividing the veterinary course at the end of the pre-clinical studies to provide for specialisation into the two main branches, namely applied science and clinical work. But these two experts approach the problem in different fashion. Weipers advocates the study of a limited number of cases in great detail with all the aids that histopathology, biochemistry, haematology and radiography can supply, admitting freely that in subsequent practice after graduation the student will probably not be able to employ many of these methods. Weipers is convinced that this approach will give a better understanding of medicine than the more formal clinical examination and analysis based on the physical senses which Boddie prefers. Boddie says: "We must protect the student against becoming gadget-minded," pointing out that there is a risk of students rushing into the use of X-rays, electrocardiographs, differential blood counts, and biochemical investigations, without first using the senses with which God provided him. Actually, of course, both the

science and the art of medicine must be taught simultaneously to be fully appreciated by the student. It is no use waiting for the result of a biochemical blood test from a cow that is staggering ; one must inject calcium and magnesium and have one's diagnosis—that was based on art—confirmed or not by the blood result some days later. Speaking personally, I favour the detailed examination of a few cases after the manner described by Weipers and Jennings. I consider it superior as a teaching discipline than the clinical examination of a larger number of cases by methods based chiefly on the senses. This view-point happens to fit well with the fact that there is usually a shortage of some types of clinical material, but it is quite fortuitous. To my mind, examination in great detail will give a better understanding of disease as an aberration from the physiological normal than the view that diseases are clinical entities characterised by a few pathognomic signs and symptoms.

In like manner when dealing with surgery. Every opportunity to perform any necessary operation should be carried out, irrespective of whether such procedures in practice would be economic. Similarly, the highest surgical and anaesthetic techniques should be employed irrespective of the fact that similar conditions are seldom likely to occur in practice. Surgical principles and techniques are taught with the knowledge that the graduate will have to amend them to meet the varying circumstances in which he will find himself in later years. He should be taught surgery as though antibiotics did not exist !

Finally, we come to the teacher. Boddie stresses first the need for vitality—enthusiasm but not flamboyance—and secondly integrity in teaching. By integrity is meant the frank admission by teachers of the gaps that exist in our present knowledge in the hope of stimulating thought in their audience and engendering an enquiring turn of mind. Discussions over obscure cases by both staff and students, especially when backed up by *post-mortem* examination and pathological reports, appear to be generally acceptable in these days by all progressive teachers. "The teacher's job is to encourage students to think" and there are few better ways to do this than by clinical conference.

All the speakers appear unanimous in their verdict against specialisation during the veterinary course. This should be left to post-graduate courses arranged to suit the various requirements of specialised services, at home and abroad.

I am deeply conscious of the inadequacy of this summary, but with such a wide field it is not possible to do justice to many of the points raised.

Tremendous opportunities are ahead of our students. In our teaching we must see to it that they are not overburdened with factual data, and to this end we must be prepared to be ruthless in our pruning of unnecessary detail, and equally insistent in our emphasis on general principles and good generalisations. We should, as far as possible, substitute the scientific approach to clinical problems in place of some of the art, but remain ever conscious of the fact that clinical art or acumen will always be necessary and will always be the more difficult part of medicine to teach adequately.

Laboratory Diagnosis of Dinitro-ortho-cresol Poisoning in Cattle

BY

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DINITRO-ORTHO-CRESOL (DNC, DNOC) and dinitro-sec-butyl phenol (DNBP, dinoseb) are herbicidal chemicals used extensively for selective weed control in cereal and legumes in this country. Both have a fairly high acute toxicity in experimental animals, the oral LD 50 value varying from 25 to 60 mg. per kg. in different species. Fractionated dosages are partially cumulative in effect. The mode of action of these chemicals *in vivo* is to cause disturbance of the carbohydrate metabolism cycle, producing an increased basal metabolic rate, proportional to the intake rate of the chemical. The signs of intoxication may therefore include listlessness, loss of appetite and activity, air-hunger, sweating, thirst, oliguria, muscular weakness, prostration, dyspnoea and death, possibly with hyperthermia. High dosages may cause toxic effects within minutes, mainly dyspnoea and convulsions. The onset of response usually occurs within minutes or hours of the last exposure, and hot weather or sudden heat waves potentiate the severity of response. The signs of DNC poisoning are much the same in all mammalian or bird species so far investigated, although marked differences exist in the rate of clearance of DNC from the blood circulation in different species. In man, signs of DNC intoxication do not occur until the concentration of DNC in the blood reaches 30 to 40γ DNC per ml. whole blood. Fatal human poisoning appears to demand a blood concentration of 75γ per ml., or higher. In other species, the blood DNC concentrations producing toxic signs or death are appreciably higher than in humans. In the absence of further exposure, blood DNC concentrations in humans fall at the rate of about 1γ per ml. per day., a far slower rate of blood clearance than in laboratory animals thus far reported on. The earliest and most specific clinical sign of human DNC intoxication is profuse and persistent sweating, not normally seen in laboratory animals (Parker, Barnes & Denz, 1951; Lawford, King & Harvey, 1954; Harvey, Bidstrup & Bonnell, 1951).

Both DNC and DNBP are persistent yellow dyestuffs, staining exposed skin, hair, wool, fur and feathers a distinct yellow or orange hue which remains obvious for weeks or even months afterwards, despite the action of water and weather. This rather striking property, indicative only of external contact with a dinitro-compound, has often caused undue alarm among farmers, gamekeepers, poultrymen and nature-observers. It is possible to show that the skin of animals can be slowly penetrated by externally applied DNC, but the dosage required to cause toxic effects solely by skin application is very high indeed. Skin or coat contamination is most unlikely to con-

tribute to the DNC-poisoning of farm stock or wild creatures, the major source of potential risk being the ingestion of the chemical from spillages, or contaminated vegetation or water. The major source of occupational hazard among spray operators is the inhalation of airborne DNC or DNBP particles in the spray-mist, but the duration of farm stock or wild creatures' exposure to spray-drift is very small, and inhalational risks correspondingly slight. Neither DNC nor DNBP have sufficient volatility to produce any vapour hazard, even among dense vegetation or in enclosed spaces.

Diagnosis of DNC Intoxication

The clinical diagnosis of DNC intoxication depends on signs which arise only when near-dangerous blood concentrations of the chemical exist. A comparatively simple analytical method exists for the determination of DNC concentration in blood, urine or other tissues, relying on the facts that the solvent methyl ethyl ketone (MEK) extracts DNC from biological materials, and that even very dilute solutions of the sodium salt of DNC or DNBP have an appreciable yellow colour (Parker, 1949). The method thus involves extraction of the tissue by MEK, in the presence of an excess of a sodium chloride-carbonate mixture, the yellowness of the MEK solution, of Na-DNC being then measured in either a photo-electric absorptiometer calibrated against standard solutions, or in a simple visual comparator provided with discs graduated in the range 5 to 50γ DNC per ml. (Edson, 1954). This analytical procedure has been used extensively in recent years for controlling the occupational exposure of workers in the manufacture or spraying of dinitro-weedkillers, and in toxicological studies on laboratory animals. Until recently, no difficulties or complications had attended its use. A recent occurrence has, however, shown that the method requires modification during investigations on cattle.

A clover field in Essex was sprayed in late October, 1954 with a herbicidal preparation of DNC, to defoliate the crop before threshing for seed. Some days later, a herd of 27 Friesian cattle on the farm showed signs of illness. It was suspected that the spraying operation and the herd illness could have been related, so venous blood samples were procured from 11 of the herd.

When analysed by the normal procedure, a yellow compound proved extractable by MEK from all the blood samples, at concentrations colorimetrically equivalent to 2 to 27γ " DNC " per ml. blood. The highest value occurred in the most seriously ill animal, which died the next day. A similar yellow compound was extractable from homogenates of both liver and kidney.

Some Post-mortem Findings

Certain anomalies existed, however, throwing doubt on the possibility that the MEK-extracted compound was DNC. The dead animal's urine contained no DNC, whereas DNC is almost invariably present in the urine of humans and laboratory animals with DNC-poisoning. The concentration in the dead animal's blood was considerably lower than that needed for lethal effects in man or other species. The yellow extractive was found to fade markedly on exposure to light for a few hours, whereas solutions of DNC in MEK are stable for prolonged periods. The absorption peak for the yellow extractive was found to be 460 mμ, while that for DNC is approximately 430 mμ. When blood samples were taken from recovering or recovered animals from the herd, the yellow extractive was found in similar or even higher concentration, up to 22γ " DNC " per ml. blood. Finally, it was found that the blood and liver of normal slaughterhouse cattle also yielded an apparently identical yellow extractive.

The yellow compound extracted by MEK from samples obtained from the Friesian herd is now believed to have been β-carotene, or a related carotenoid pigment. Carotene normally occurs in the blood of cattle at concentrations of from 2 up to 16γ carotene per ml. of plasma (Goodwin, 1952). A sample of pure β-carotene, kindly provided by Mr. A. N. Worden, was found to have absorptiometric properties almost identical with those of the yellow compound found in the herd samples. When the optical densities of MEK-extracts of herd samples were referred to a calibration curve made for pure β-carotene, the resulting blood carotene levels were found to lie almost within the accepted normal limits in cattle, the highest being 17γ per ml. plasma.

A method of separating DNC from β-carotene in blood and tissue homogenates was then worked out, relying on the finding that when a mixed solution of DNC and carotene in chloroform is shaken with an aqueous solution of sodium carbonate (5 per cent.), the carotene remains in the chloroform layer, while the DNC transfers almost completely to the aqueous layer. The optical density of this aqueous solution of Na-DNC can then be referred to a calibration curve made up from standard solutions of Na-DNC, subjected to a similar extraction procedure. It is thought probable that the analytical distinction between DNC and carotene in biological samples can be made even simpler, so further studies are in progress, and will eventually be published. However, the above method showed very clearly that the yellow compound in herd samples was not DNC, but more probably β-carotene. It is therefore evident that the analytical determination of DNC concentration in biological samples from cattle requires a further step to ensure that β-carotene is removed from the MEK-extract before determination of optical density.

Small Risk to Farm Stock

Dinitro-weedkillers have been in use in this country for more than 10 years, and in recent years about 200,000 acres of cereals or legumes have been sprayed annually with DNC or DNBP. The reason why the present problem has not arisen previously is that despite the quite high toxicity of the chemicals, and their wide-scale use, very few instances have arisen where DNC-poisoning of farm stock has occurred or even been claimed (Edson, 1954b). Isolated cases have occurred where obvious neglect of the safety precautions needed (and clearly stated on manufacturers' container labels) has led to illness or death of indivi-

(*Continued at foot of col.* 1, *page* 452)

The Late Treatment of *Trypanosoma congolense* Infection in Zebu Cattle with Ethidium Bromide

BY

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Introduction

ETHIDIUM bromide has been shown by various workers to cure *Trypanosoma congolense* infection in Zebu cattle when given in the early stages of the disease. Wilde & Robson (1953); Wilson & Fairclough (1953); Ford, Wilmshurst & Karib (1953); and Robson & Milne (1954), all administered the drug as soon as all their experimental animals showed positive blood slides.

In the course of a previous experiment (Robson & Milne, 1954) 20 Zebu cattle were infected with *T. congolense* and left untreated as a control group. By the 52nd day after infection, nine of these animals had died of trypanosomiasis and in the interests of economy 10 of the remaining 11 were treated on the 53rd day after infection with 0.25 gramme ethidium bromide. On the morning of treatment all 10 cattle showed trypanosomes in their blood and subsequent to treatment blood slides were examined at frequent intervals. Trypanosomes had disappeared from the blood of all the animals by 25 hours after treatment. Three of these cattle subsequently died from malnutrition, but at the conclusion of the experiment the seven remaining cattle were still free from trypanosomes in their peripheral circulation 90 days after treatment.

This indicated that ethidium bromide might prove valuable as a curative in *T. congolense* infection in Zebu cattle even when administered a considerable time after infection, and it was decided to investigate this point further.

Methods

1. The seven cattle from the authors' previous experiment (Robson & Milne, 1954) which had been treated with 0.25 gramme ethidium bromide 53 days after infection with *T. congolense*, were retained in the present experiment. Thick blood slides were taken from them on three mornings each week and examined after being stained with Giemsa. This routine was continued until 125 days after the cattle had been treated.

2. Twenty-five Zebu cattle of varying weights and ages were infected with a field strain of *T. congolense* (Strain Godegode II) collected from an area where no trypanocidal treatments had been carried out. Before being used to infect the cattle the collected blood was passed through goats at the laboratory to free it from any possible Theilerial infection.

For the duration of the experiment thick blood slides were taken from all animals on three mornings each week and examined after being stained with Giemsa. On the 53rd day after all 25 cattle had shown positive blood slides, 20 were treated; each animal irrespective of live-weight, receiving 0.25 gramme ethidium bromide in 10 ml. aqueous solution, administered intramuscularly.

The experiment began in April, 1954, and was concluded at the end of October, the last five months thus coinciding with one of the worst dry seasons to have

TABLE

SHOWING DISAPPEARANCE OF TRYPANOSOMES FROM BLOOD SMEARS, AFTER TREATMENT WITH 0·25 GRAMME ETHIDIUM BROMIDE

Number of animal	Before treatment	After treatment			
		5 hours	20½ hours	25½ hours	29 hours
77	pos.	pos.	pos.	neg.	neg.
271	pos.	pos.	pos.	neg.	neg.
107	pos.	pos.	pos.	neg.	neg.
124	pos.	pos.	pos.	pos.	neg.
256	pos.	pos.	neg.	neg.	neg.
295	pos.	pos.	pos.	neg.	neg.
297	pos.	pos.	neg.	neg.	neg.
299	pos.	pos.	neg.	neg.	neg.
71	pos.	pos.	neg.	neg.	neg.
260	pos.	pos.	pos.	neg.	neg.
289	pos.	pos.	neg.	neg.	neg.
298	pos.	pos.	pos.	neg.	neg.
115	pos.	pos.	pos.	neg.	neg.
287	pos.	pos.	pos.	pos.	neg.
29	pos.	pos.	pos.	neg.	neg.
257	pos.	pos.	pos.	neg.	neg.
292	pos.	pos.	pos.	neg.	neg.
252	pos.	pos.	neg.	neg.	neg.
261	pos.	pos.	pos.	neg.	neg.
290	pos.	pos.	pos.	neg.	neg.

(*Continued from page* 451)

dual farm animals. The main risks to farm stock arise from failure to clean up or cover spillages of the concentrated chemical, from leaving empty but unwashed containers accessible to stock, and from allowing farm stock access to crops and hedgerows adjacent to very recently sprayed fields. If commonsense precautions are taken to avoid such obvious hazards, there appears to be little, if any, risk to farm stock from the use of DNC or DNBP in agriculture, as far as either theoretical assessments or casualty reports go to show.

Acknowledgment.—We are very much indebted to Mr. H. G. McShane, M.R.C.V.S., the veterinary surgeon concerned with the reported occurrence, for his valuable collaboration.

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been experienced at Mpwapwa. From June onwards environmental conditions were of the utmost severity but no supplementary food was fed to any of the experimental animals.

Results

The seven cattle retained from a previous experiment (Robson & Milne, 1954) remained free from trypanosomes in their peripheral blood for a period of 125 days after treatment, when they were considered cured and blood sliding was stopped.

Eight days after being infected with *T. congolense* (Strain Godegode II) a group of 25 cattle all showed positive blood slides. On the 61st day after infection 20 were treated. All showed positive blood slides on the morning of treatment and subsequent results are shown in the following table.

Of the 20 treated animals, one died 99 days after treatment, but its death was not due to trypanosomiasis. This animal showed negative blood slides up to the time of death.

The remaining 19 treated animals all showed negative blood slides up to the 125th day after treatment, when they were considered cured and the experiment was concluded.

Of the five control animals all had died from trypanosomiasis by the 111th day after infection.

Summary

Taking as the criterion of cure the absence of trypanosomes from the peripheral circulation for 125 days as determined by thrice weekly examination of thick blood smears, ethidium bromide cured Zebu cattle experimentally infected with *T. congolense* administered 53 and 61 days after infection.

The untreated control animals died from trypanosomiasis within a period of 111 days after infection.

Acknowledgment.—We are indebted to the Director of Veterinary Services Tanganyika Territory for permission to publish this note.

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BOOK REVIEWS

British Poisonous Plants. By A. A. FORSYTHE. H.M.S.O. Price 6s. 6d.

This book is described as being written for the stockowner and the "country reader," but it is in reality a well-prepared veterinary text book, which, in places, will be "heavy going" for the layman, despite a glossary of technical terms. Nevertheless, although the "country reader" might be bemused by "haemorrhagic infarcts in the kidneys," the toxic symptoms of the various plant poisons are lucidly explained. The signs of poisoning, and the morphology of the members of 34 families of plants, plus fungi, are described, and illustrated by 20 good photographs, four of which are coloured. It is a pity that there are not more of these photographs, which are of great assistance to those who have not the time, inclination, or knowledge to determine the intricacies of ovate-lanceolate floral leaves, and other botanical details.

The recommendations for treatment are confined to first aid measures, and "homely" remedies, with a plea to call for professional advice. This ethical approach is maintained throughout except for a lapse when the reader is advised to try penicillin and nicotinamide to alleviate bracken poisoning. The book is well printed on indifferent paper, poorly bound, and denied the protection of a stiff cover. It is a very useful contribution to the subject of toxicology, and deserves a place in every practice and farm.

D. W. J.

Veterinarhygiene. By E. Roots, H. Haupt and H. Hartwigk. 1955. Berlin: Paul Parey.

This quite small but comprehensive text is intended as a text-book for veterinary students and a reference book for practitioners. The authors hold Chairs in the veterinary schools in Giessen and in the Free University in Berlin.

There are chapters dealing with air and sunlight, soil, water, poisons in foodstuffs, grazing, housing, production (including breeding, work, milk, meat, wool and eggs), care of skin, hoofs and horns, and practical disinfection and disinfestation.

A text devoted to maintaining animals healthy by attending to their environment must inevitably be coloured by the sort of conditions in which they are usually kept. This book is thus quite naturally related directly to current farming practice in Germany, which is in some ways very different from that in the United Kingdom. One example of this difference is the reference to 350,000 draught oxen and 2,400,000 draught cows in Germany in 1934. There is no mention of the present position but the fact that space is devoted to harness for draught cattle and to the effect of draught on milk yield suggests that this form of power on the farm is still common. The authors might well have given figures more recent than those for 20 years ago. There is sometimes a failure to distinguish clearly between old and new, and between theoretical and practical. While it may

thus be of value to record that sheep and goats are more easily milked when standing on a raised platform, which they can readily be trained to do, the reader outside Germany is left wondering just how important sheep and goats are as sources of milk in that country. Mammoth incubators, electric fencing, and a cowshed with a mechanical dung remover built into the floor of the dung channel are some of the modern farming devices that are illustrated; they form a striking contrast to the water wagon and plough.

The text contains a very large amount of information and reads easily. Perhaps too much information of some kinds is given, such as reference to the stratosphere and ionospere and to variations in the composition of the atmosphere itself at different heights above sea level. Such details are normally taught in the physics course and seem hardly important enough to deserve recapitulation, especially when the vast subject of veterinary hygiene offers so much scope for discussion of subjects more important to animal health.

There are some references in the text to other authors, but no details of their publications. The production of the book itself conforms to the high standard of Paul Parey's publications.

The book would probably cost about 45s. in the United Kingdom.

ABSTRACT

Chlorpromazine. WILSON, G. M., & WOOD, D. R. (1955). *Practitioner*, April, 1955. 494-501.

Chlorpromazine has been introduced with much publicity and is now widely prescribed in human medical practice. It has a powerful action as a central nervous system depressant and probably has valuable uses in anaesthesia and as an anti-emetic.

Chlorpromazine is available commercially in Britain under the trade name of largactil. Chlorpromazine is 3-chloro-10-(3'-dimethylamino-n-propyl) phenothiazine, but unlike its parent compound phenothiazine it has little parasiticidal action. It is closely related chemically to promethazine (phenergan) and was discovered during a search among related phenothiazine derivatives for substances with greater central depressant activity than promethazine.

The antihistaminic activity of chlorpromazine is unimportant by comparison with promethazine. But chlorpromazine has hypothermic actions and is an antipyretic. Chlorpromazine has a central depressant action of its own and it also potentiates the action of anaesthetics, hypnotics and analgesics. It also has an anti-emetic effect preventing vomiting induced by apomorphine in dogs.

Most of the drug is destroyed in the body, only 6 to 8 per cent. appearing in the urine. The excretion rate is maximal 6 to 24 hours after a dose, but there is some present in the urine during the next few days. The importance of the liver in breaking down the drug is suggested by the observation that the drug is more effective in patients with poor liver function. *"Though chlorpromazine has been widely advocated for many conditions it is difficult to assess its real value in therapy."* Chlorpromazine has been used chiefly as an anti-emetic, a sedative and as an adjunct to anaesthesia.

The value of chlorpromazine as an anti-emetic has been widely proclaimed and in several instances its value has been definitely established. Vomiting, however, is only a transient disturbance in many diseases and unless great care is taken in the design and execution of tests, it is difficult to determine whether relief is due to the administration of a drug. Before the drug is given the cause of the vomiting must be determined as after its administration the clinical features may be obscured.

As a sedative chlorpromazine has been used extensively in psychiatry. Recent reports suggest that its greatest value is in the treatment of states of mania delirium confusion and agitation irrespective of the underlying psychopathology. At present nothing can be said about long term results.

In anaesthesia chlorpromazine is used as a premedication before operation and may be valuable in preventing post-operative vomiting. By virtue of its depressant action it adds to the effect of narcotics, relaxants, and anaesthetics so that the doses of these agents may be correspondingly reduced. The action of chlorpromazine is relatively long and the persistence of drowsiness and immobility after the operation may be undesirable. On the other hand if post-operative quiet and absence of vomiting are considered essential the drug may well be useful.

Chlorpromazine causes a peripheral dilation which increases heat loss from the body and it abolishes or greatly reduces the reflex vaso-constriction which normally follows the exposure to cold. These actions aid production of body cooling.

It has been stated that the introduction of chlorpromazine has increased the ability of patients to withstand severe trauma but in view of many other coincident innovations in anaesthetic practice it is impossible to evaluate these claims.

The central depressant action of chlorpromazine is of assistance in the treatment of persistent intractable pain. It can be used to potentiate the action of drugs such as morphine.

Chlorpromazine is supplied for oral and parenteral administration. Oral administration is the method of choice. In adult human patients the dose is one 25 mg. tablet given every eight hours. The drug may be given by deep intramuscular injection. It must *not* be injected subcutaneously. In anaesthetic practice it can be given intravenously but owing to its irritant effect on the vein the standard solution must be freely diluted with normal saline and injected slowly.

In spite of the amount that has been used the uses of chlorpromazine are not yet clearly defined and properly designed clinical trials comparing its properties with other sedatives are urgently required.

G. F. B.

News and Comment

BELFAST CONGRESS

Hotel Bookings

Block bookings of accommodation in various hotels in Belfast have been made for visitors to the Congress. However, unbooked reservations cannot be held indefinitely and it is imperative that those who intend to go to the Congress and who have not yet arranged their hotel accommodation should do so without delay. Bookings should be made through Major G. E. Hamill, c/o Veterinary Research Division, Ministry of Agriculture, The Farm, Stormont, Belfast.

THE ECONOMICS OF POULTRY FARMING

A conference on the Economics of Poultry Farming arranged between the N.A.A.S. and the Buckinghamshire Local Education Association was held at County Farm, Stoke Mandeville, on Monday, May 23rd. Papers were given by Dr. R. Coles, Chief Poultry Advisory Officer, Ministry of Agriculture, and Mr. Hugh Finn, Chairman of the Agricultural Improvement Council, Poultry Group.

Dr. Coles gave figures to show the rapid growth of intensive methods of poultry farming in this country over the last few years, and to show the reasons why economic pressure is making it essential for the bulk of egg production in this country to be supplied by specialist producers working with large intensive units. His figures showed that small producers are only able to make a reasonable profit if "family labour" is used, or where the labour and overheads on a mixed farm are not increased by the poultry.

Mr. Finn spoke of the economics of poultry breeding and started a discussion on the wider aspects of this subject including the uses of progeny testing and artificial insemination.

The conference programme included a number of exhibits, prominent among which was the Animal Health Division exhibit dealing with poultry disease problems.

SUFFOLK COUNTY AGRICULTURAL SHOW

Major W. H. Wortley, M.R.C.V.S., Honorary Veterinary Surgeon to the Suffolk County Agricultural Show, had the honour of being presented to Her Majesty Queen Elizabeth, the Queen Mother, when she visited the Show on Wednesday, June 1st. This is a two-day show, and it was held at Benacre, Wrentham.

DEATH OF WILLIAM FRANCIS HUGHES

William Francis Hughes, M.R.C.V.S. (retd.) died at his daughter's and son-in-law's residence, Eisgobty, St. Asaph, on May 24th, 1955. He graduated on July 16th, 1897, from New Edinburgh. His funeral took place on Friday, May 27th, and he was 85 years of age.

MYXOMATOSIS IN HARES

It has now been confirmed that a British brown hare (sp. *Lepus Europaeus occidentalis*) killed by a dog at Wilton, Wiltshire, recently was suffering from myxomatosis. This confirms the findings in France that in rare instances the hare may be affected but it is emphasised that there is no evidence that the disease affects other animals or human beings.

On February 11th the Ministry of Agriculture and Fisheries confirmed that the carcase of a hare found in Northern Ireland was affected with myxomatosis. The hare was a mountain hare (sp. *Lepus timidus*) also known as the blue or varying hare. This was the only other occasion on which myxomatosis had been confirmed in a hare in the United Kingdom.

PARROT DISEASE IN AIRCRAFT CARRIER

A case of psittacosis (parrot disease) has occurred in the aircraft-carrier *Centaur*, which berthed at Portsmouth on June 7th on her return from the Mediterranean. About four days previously Chief Radio Artificer Richard Patrick Coleman, of Drayton Road, Portsmouth, was found to be suffering from the disease, and when the ship arrived at Spithead he was flown to the Royal Naval Hospital, Haslar. It was stated there that he was recovering.

In the *Centaur* is a large number of budgerigars which members of the crew have brought home as gifts. These birds were examined by the port medical authorities and two, which were the property of Coleman, showed symptoms of psittacosis.

Their bodies have been sent to the Central Public Health Laboratory at Colindale for examination and report. Until the other birds have been certified free from psittacosis none can be brought ashore.

QUESTION IN PARLIAMENT

Attested Cattle Examinations (Veterinary Surgeons)

SIR A. BOSSOM asked the Minister of Agriculture, Fisheries and Food if he will approve the employment of available veterinary surgeons in private practice when there are not enough Government veterinary surgeons available to make the necessary examinations for attested cattle.

MR. AMORY: This is already the practice, and about 1,750 private veterinary surgeons are employed on this work by my Department.

CAMEL "MYSTERY" SOLVED

Some of the peculiarities of the camel which enable it to put in a hard day's work without water in desert sun have been discovered during a year's investigation at Beni Abbes, 500 miles within the Algerian Sahara, where the temperature reaches 140° F., writes the science correspondent of *The Times*.

The research was directed by Professor Knut Schmidt-Nielsen, Professor of Zoology at Duke University, North Carolina, who with his wife, Dr. Bodil Schmidt-Nielsen, has been responsible for earlier discoveries about the adaptations which enable small desert-living mammals to obtain the water that they need. In their most recent research they were assisted by Dr. T. R. Houpt, of the University of Pennsylvania, and Dr. S. A. Jarnum of the University of Copenhagen.

The investigation was sponsored by UNESCO and other bodies. Results were reported at an international meeting on arid lands held lately at the University of Arizona.

As well as the more obvious means of reducing water losses, it has been found that the camel is largely relieved of the necessity to cool itself by sweating. Its body temperature can rise from its "normal" of 93° F. to 104° F. without ill effects. This rise not only makes possible a direct saving from absence of sweating, but also reduces the rate at which heat is absorbed from hot surroundings. So, too, does the excellent heat insulation provided by thick fur.

However, there is a limit even for the camel. When its temperature reaches 104° F.—11° above normal—sweating sets in and prevents any further rise in temperature.

Even then there is no loss of fluid from the blood stream. The concentration of the blood plasma remains close to normal under the most strenuous conditions and the water needed for digestion and evaporation comes from the body tissues, from the spaces between muscle cells, and from the cells themselves.

There is no foundation for the idea that the camel drinks abnormal quantities of water when it can and stores this in its multiple stomachs. There is no excess of water in the camel's stomach, and it is normally a small drinker.

Under winter conditions, with vegetation plentiful, grazing camels were found to show no need of water even after two months without a drink. A camel kept on a dry diet in the hottest part of the summer went for seven days without water, lost more than one-fourth of its weight, but was not in serious condition.

DOG'S FEAT IN ALPS

A remarkable feat is reported by *The Times* correspondent from Gressoney in the Aosta valley. Maccabeo, a three-year-old Irish setter, belonging to a hotel proprietor of the zone, has climbed alone the Mount Rosa glacier, crossing from Gressoney to Zermatt in Switzerland. Maccabeo disappeared one morning last month from Gressoney. He was sighted the same evening on the Garstelet glacier, trotting towards the col del Lys. Two days ago he was found at Zermatt, utterly exhausted, by an Italian climber, who identified the dog by the name of the owner on the collar.

Maccabeo is probably the holder of the high-altitude climbing record for domestic animals. Last year in one of his lonely excursions he reached the Margherita hut, the highest in the world (about 15,000 ft.). The previous record is believed to have belonged to a cat, who the year before followed a party of climbers to the top of the Matterhorn and back.

THE HARRY STEELE-BODGER MEMORIAL PRIZE

Applications are invited by July 30th, 1955, from members of the Royal College of Veterinary Surgeons or Final Year students of any of the veterinary schools for the Harry Steele-Bodger Memorial Travelling Scholarship or grant towards a tour of study outside the United Kingdom or Eire in 1956.

Full details of the rules and regulations governing the award can be obtained from Mr. F. Knight, General Secretary, British Veterinary Association, 7, Mansfield Street, Portland Place, London, W.1.

PERSONAL

Births

HARLEY.—On May 26th, 1955, to Jill, wife of Peter Harley, M.R.C.V.S., April Cottage, The Fairway, Devizes, a son, Michael John.

MCCLELLAND.—On May 29th, 1955, at Shrewsbury, to Mary, wife of H. A. McClelland, M.R.C.V.S., Market Drayton, a son.

PYKE.—On June 3rd, to Marie (*née* Monk), and Brian Pyke, MS.R.C.V.S., of Stone, Staffs, a daughter.

SIMPSON-WHITE.—On May 29th, 1955, to Sylvia, wife of Patrick Simpson-White, M.R.C.V.S., c/o St. Mark's Vicarage, Reigate, Surrey, a daughter.

THE DEATH OF MR. A. H. MILNE

It is with great regret that we hear that Mr. A. H. Milne, M.R.C.V.S., Chief Veterinary Officer for the Tanganyika Territory, lost his life when the Dakota aeroplane in which he was returning on leave to this country crashed on Mount Kilimanjaro on May 18th.

A fuller appreciation will be published in a later issue.

R.C.V.S. OBITUARY

MILNE, Alexander Henry, Chief Veterinary Officer, Veterinary Research Laboratory, Mpwapwa, Tanganyika. Graduated Edinburgh, December 16th, 1938. Died May 18th, aged 39 years.

HEAD OF IRAQI VETERINARY SERVICES VISITS BRITAIN

Dr. Sadek M. Jewad, Director General of Veterinary Services in Iraq since 1948, is in the United Kingdom until June 30 as the guest of the British Council to study veterinary services.

During the first week of his visit, the Ministry of Agriculture have arranged for him to see some of their veterinary laboratories and research centres. On June 7th he visited the Veterinary Laboratory at Weybridge, and the following day he went to the Animal Health Division at Guildford, where he saw the abattoir and a dairy farm. On June 9th he visited the Agricultural Research Station at Compton, Berkshire.

Whilst in this country he will visit the Royal Stables to see the Arab horse presented by Iraq to H.M. the Queen, and on June 11th he will attend the Royal Horse Show at Richmond. On June 19th he will go to Scotland to visit the Royal (Dick) Veterinary College, Edinburgh, where he studied from 1937 to 1939, and he will then go on to see the Royal Highland Show. He will also attend the Royal Counties Show at Horsham on June 25th.

Dr. Jewad has represented his country at several international congresses and is the author of a number of papers on veterinary matters which have appeared in Arabic journals.

HOLIDAY EXCHANGE

There appear to be a number of French veterinary surgeons whose sons and daughters would like to spend part of their summer holidays with British veterinary surgeons and, in return, would like to entertain the British children in their homes.

The following is a list of places where there is a French veterinary family who would like to make this exchange, and any member of the profession who is interested is asked to write as soon as possible to the General Secretary of the B.V.A. for further particulars.

Gers : 13-year-old boy.
Vienne : 16-year-old girl.
Maine-et-Loire : 14-year-old girl.
Vienne : 14-year-old boy.
Cholet (Maine-et-Loire) : 14-year-old girl would like to stay in Southampton area from mid-July.

R.C.V.S. EXAMINATIONS

June 13th, Monday.—D.V.S.M. Oral and Practicals commence.

June 23rd, Thursday.—M.R.C.V.S. Written Examinations.

June 24th, Friday.—M.R.C.V.S. Written Examinations.

June 27th, Monday.—M.R.C.V.S., Practical and Orals commence (Panels "A" and "B").

B.V.A. COUNCIL AND COMMITTEE MEETINGS IN LONDON

Wednesday, July 6th.—

10.30 a.m. Home Appointments Committee, at 7, Mansfield Street, W.1.

12 noon Parliamentary and Public Relations Committee, at 7, Mansfield Street, W.1.

2.00 p.m. Organising Committee, at 7, Mansfield Street, W.1.

Thursday, July 7th.—

10.30 a.m. Veterinary State Medicine Committee, at 7, Mansfield Street, W.1.

2.30 p.m. General Purposes and Finance Committee, at 7, Mansfield Street, W.1.

Friday, July 8th.—

10.30 a.m. Council Meeting at the Connaught Rooms, Great Queen Street, Kingsway, W.C.2.

COMING EVENTS

June

15th (Wed.). Meeting of the North Wales Division, B.V.A., at the Masonic Hall, Oswestry, 2.15 p.m.

Summer Meeting of the South-East Midlands Division, B.V.A., at the Cambridge and District Cattle Breeders' Association Centre. Meet at the University Arms Hotel, Cambridge, 1 p.m.

16th (Thurs.). Annual General Meeting of the Herts and Beds Division, B.V.A., at 70, Holywell Hill, St. Albans, 7.30 p.m.

22nd (Wed.). Meeting of the Supplementary Veterinary Register Division, B.V.A., at 7, Mansfield Street, London, W.1, 2 p.m.

Summer Meeting of the Lancashire Division, B.V.A., at the Headquarters of I.C.(P) Ltd., Wilmslow, Cheshire, 2.45 p.m.

Annual General Meeting of the Southern Counties Division, B.V.A., at the Potters Heron Hotel, Ampfield, Nr. Winchester, 4 p.m.

23rd (Thurs.). Meeting of the Technical Development Committee, B.V.A., at 7, Mansfield Street, W.1, 10.30 a.m.

24th (Fri.) Annual General Meeting of the Lincolnshire and District Division, B.V.A., at the George Hotel, Grantham, 2.15 p.m.

July

1st (Fri.). Ordinary General Meeting of the Society of Practising Veterinary Surgeons at the Dolwar Café, Carmarthen, 2.15 p.m.

6th (Wed.) Annual General Meeting of the A.V.T. and R.W.'s (Northern Region) at Harper Adams Agricultural College, Newport, Salop, 10.30 a.m.

20th (Wed.). Annual General Meeting of the Southern Region of the A.V.T. & R.W.'s at the Agricultural Research Council Field Station, Compton, Berks.

28th (Thurs.) President's Invitation Luncheon and General Meeting of the Midland Counties Division, B.V.A., at the Swan Hotel, Stafford, 12.30 p.m.

September

4th to 10th. 73rd Annual General Meeting and Congress of the British Veterinary Association at Belfast.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Kirkcudbright. Low Barlay Farm, Girthon, Gatehouse of Fleet, Castle Douglas (June 1).

Leics. Orchard Farm Premises, Horninghold, Market Harborough (May 28).

Lincs. Barlows Farm, Woolsthorpe by Belvoir, Grantham (June 2).

Norfolk. Church Farm, East Lexham (May 28).

Yorks. Wyse Hill Farm, Starlforth (June 2).

Fowl Pest

Essex. 35, Peter Street, Canning Town, E.16 (May 29).

Lincs. Fellards Gate, Old Leake, Boston (May 28).

Norfolk. Hill Cottages, Shelfanger, Diss (May 28).

Swine Fever

Ches. Crown Farm, Oakmere, Northwich (May 29); Bankhead Farm, Broxton, Chester; Crewe Arms Piggery, Tommy's Lane, Crewe (May 31); 42, Shrewbridge Road, Nantwich; 42, Herbert Street, Sydney, Crewe (June 2); Pump House Farm, Scholar Green, Stoke-on-Trent (June 3).

Cornwall. Hillside, Lerryn, Lostwithiel (June 3).

Derby. Haslin House Farm, Harper Hill, Buxton (June 3).

Denbigh. Adwy Farm, Coedpath; Coedlloedd Ucha Farm, Ruabon; Bryn Mawr, Bryn Lane, Isycoed, Wrexham (June 1).

Devon. Great Garlandhayes, Clayhidon, Hemyock (May 31); Overlands Farm, Halberton, Tiverton (June 1); Mill Farm, Yoeford, Crediton (June 3).

Dumbarton. Bonnaughton, Bearsden, Glasgow (June 3).

Essex. Sycamore Farm, Alphamstone, Bures (May 31); Wayside, Mundon, Chelmsford (June 2).

Flints. Gwern-dy-folog, Leeswood, Mold (May 30).

*Glouc*s. Aston Road, Chipping Campden (May 31).

Herts. Chalkdells, Darebridge Road, Much Hadham (June 2).

Lancs. Ingol House Farm, Ingol, Preston; Springbank Farm, Samlesbury, Preston (May 31); 47, Meanygate, Bamber Bridge (June 1); Dunster's Farm, Westleigh Heath, Leigh (June 2); Wesham Hall Farm, Wesham, Kirkham; Fir Tree Farm, Stretton, Warrington (June 3).

Norfolk. Home Farm, Wallington, King's Lynn; Glebe Farm, Feltwell, Thetford (May 31); Barroway Drive, Stowe Bardolph, Downham Market (June 2).

Salop. 23, Nobold, Baschurch, Shrewsbury (May 31); Moat House, Eardington, Bridgnorth; The Wythins, Wroxeter, Shrewsbury (June 2).

Somerset. Seaborough Hill Farm, West Crewkerne (May 29).

Staffs. Nursery Farm, Codsall, Wolverhampton; Hayes House Farm, Bramshall, Uttoxeter; Hollybank Farm, Garshall Green, Milwich (May 31).

Stirling. No. 4 Holding, Barraston, Torrance, Glasgow (May 31).

Suffolk. Church Farm, Ship Meadow, Beccles (May 31).

Surrey. Silvermore Farm, Byfleet Road, Weybridge (June 2).

Sussex. Heath View, North Chailey, Lewes; Amberstone Grange, Hailsham (May 31).

Warwicks. Pig Farm, Nelsons Lane; Woodfield Farm, Napton, Rugby; Upthorne Farm, Ettington Park, Alderminster, Stratford-on-Avon (June 1); Pig Farm, Nelsons Lane, Warwick; Malvern Park Farm, Solihull; Woodlands Farm, Hockley Heath; Victoria Cottage, Livingstone Road, Birmingham, 20 (June 2).

Worcs. Hill View, Lower Hook, Upton-on-Severn (June 2).

Yorks. Park Farm, Londesborough; 422, Broad Lane, Leeds, 13; The Poultry Farm, Dalton Magna, Rotherham (May 31); Coronation Terrace, Austerfield, Doncaster; Piggeries, Chemical Works Allotments, Amberley Road, Leeds, 12 (June 1).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

FURAZOLIDONE AND THE CONTROL OF BLACKHEAD IN TURKEYS

Sir,—Blackhead in turkeys can be controlled by incorporating the compound 2-amino-5-nitrothiazole in their food. Relapses, which frequently occur when the medicated food is withdrawn, are often regarded, quite erroneously, as indicative of reinfection. This compound may also be used with considerable success in preventive medication. On reviewing the problem of blackhead as a whole it

seems that preventive medication is, at present, the surest means of controlling the disease (cf. Joyner and Kendall, 1955).

Recent reports from the United States (McGregor, 1953; Harwood & Stunz, 1954) have stated that another compound N-(5-nitro-2-furfurylidene)-3-amino-2-oxazolidone or furazolidone, showed prophylactic activity against experimentally induced blackhead.

A series of experiments has just been completed to determine the value of furazolidone in the prevention of fatal disease and as a treatment of established infections induced by administering *Heterakis* ova to turkey poults. Briefly, the results suggest that furazolidone, used continuously in the food at concentrations of 0.01—0.02 per cent. w/w, effects a reduction in mortality from blackhead, or prevents deaths altogether. At most of the concentrations used, furazolidone showed some inhibitory effect on the caecal phases of *Histomonas meleagridis*. However, protozoal activity occasionally recurred on the withdrawal of the medicated food. Observations have suggested the existence of a direct relationship between strength of compound used and the extent to which infections developed. Courses of continuous preventive medication are necessary to ensure protection since the effect of the compound, at lower concentrations, is to inhibit and not permanently suppress multiplication of the protozoa.

Complete suppression of a ten-day-old histomonad infection in turkey poults was obtained by using furazolidone at a concentration of 0.04 per cent. w/w in the food until the 24th day of the infection. Autopsies of turkeys so treated were made 39 days after medication had ceased. No caecal or hepatic lesions were found and it was assumed that multiplication of the histomonads was permanently suppressed and that spontaneous recovery had followed. Should further work confirm these findings furazolidone may prove of value in the treatment of established infections but, under farm conditions, such treatment may have to be followed by further treatment at the preventive level to cover possible reinfections.

The results of these experiments will be published *in extenso* elsewhere.

Treatment with furazolidone should be confined to non-breeding stock until more knowledge is available of any side-effects produced by the drug. The question of possible toxicity of the compound is being studied at this laboratory.

Yours faithfully,

C. HORTON-SMITH and P. L. LONG,

Poultry Research Station,
Animal Health Trust,
Houghton Grange,
Hunts.

May 15th, 1955.

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JOYNER, L. P., & S. B. KENDALL. (1955). *Vet. Rec.* **67**. 180.
MCGREGOR, J. K. (1953). *J. Amer. vet. med. Ass.* **122**. 312.

ENZOOTIC HAEMATURIA OF CATTLE

Sir,—As far as I know no definite aetiology has been propounded for enzootic haematuria of cattle, and although not a particularly common disease, it can be a source of some loss as it seems to appear from time to time on the same farm. I have tried many treatments, ranging from turpentine and oil to the intravenous injection of formalin. Some Russian workers claimed success with heavy dosage of phenothiazine, but the few cases I tried it on failed to respond.

Over the last two years I have been using vitamin K analogue*—a single dose of 60 mg. injected intramuscularly with apparently consistently good results. Whether relapses occur, I am not able to say, but so far have not been notified of any. Vitamin K analogue orally does not appear to be as effective. As this disease is not common, and I have only treated some 10 cases over this period, it is impossible to be certain whether the treatment is as effective as it appears to be. Also, most untreated animals tend to improve and relapse again over a period of time. In spite of this, however, the dramatic response which follows vitamin K therapy certainly suggests it to be of value.

Yours faithfully,

GEORGE SHENMAN,

Massey Street,
Smithton,
Tasmania.

May 26th, 1955.

* Kapilin, Glaxo.

GLYCINE-EGG-YOLK SEMEN DILUENTS

Sir,—From queries reaching me it is clear that some misunderstanding has arisen on the composition of glycine-egg-yolk semen diluents recently described in articles by Dr. Roy and myself (Roy & Bishop, 1954; Bishop, 1954; Roy, 1955). In these articles we have used the designation 4 per cent. glycine-egg-yolk to denote a mixture of 4 per cent. glycine in distilled water with an equal volume of fresh hen egg-yolk. The final concentration of glycine in the complete diluent, disregarding that which naturally occurs in the egg-yolk, is therefore 2 per cent. Similarly, 6 per cent. glycine-egg-yolk denotes a mixture of equal volumes of 6 per cent. glycine and egg-yolk, and 3.2 per cent. sodium citrate and egg-yolk.

Yours faithfully,

MARCUS W. H. BISHOP,

A.R.C. Unit of Reproductive Physiology and Biochemistry,
Animal Research Station,
Huntingdon Road,
Cambridge.

May 25th, 1955.

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EOSINOPHILIC MYOSITIS IN THE DOG

Sir,—Eosinophilic myositis in the dog was first described by Kuscher in 1940 in Vienna. A report of a case in the U.S.A. and a review of the literature has been made by Winter & Stephenson (1952), and cases have also been reported from Scandinavia. We wish to report the occurrence of three cases seen recently at the Liverpool University Veterinary Hospital, as we believe the condition has not previously been recorded in Britain. A full account will be published later.

Amost all the recorded cases have been in Alsatians, and our cases were all in this breed. Symptoms varied in their intensity but were otherwise similar. Symmetrical swelling of the masseter, temporalis and pterygoid muscles was present so that the head resembled that of a fox. Exophthalmos and prolapse of the membrana nictitans occurred, and in addition one dog was blind. Varying degrees of tonsillar swelling were observed. During the attacks, the temperatures were slightly elevated. Blood examinations showed a leucocytosis, with eosinophil counts varying between 12 per cent. and 62 per cent. Attacks appear to last for up to two to three weeks, regression of muscle swelling being followed by atrophic changes. The eosinophilia regresses more slowly. The condition appears likely to recur at intervals of several months and may be of increased severity.

Post-mortem lesions are largely confined to the affected muscles. These are very congested and haemorrhagic and show marked longitudinal pale streaks. The submaxillary lymph nodes show varying degrees of lymphadenitis. Microscopically, the lesions consist of massive eosinophilic infiltration of the muscles, necrosis of muscle fibres and haemorrhage. At a later stage, plasma cells predominate and ultimately fibrosis becomes a feature.

Various treatments have been tried, without apparently affecting the course of the condition.

We would be very pleased to hear from practitioners encountering similar cases, particularly with a view to obtaining autopsy material, as this may help to establish the aetiology of the condition.

We wish to acknowledge the help of Mr. A. Mutch, M.R.C.V.S., who brought two of these cases to our notice.

Yours faithfully,
H. P. HARDING,

Department of Veterinary Pathology,
University of Liverpool,
L. N. OWEN,

Veterinary Hospital,
University of Liverpool.

June 1st, 1955.

R.C.V.S. COUNCIL ELECTIONS

Sir,—May I take this opportunity of expressing my thanks to all those members who gave me the confidence of their vote in the recent election of the Council R.C.V.S., particularly as there are many who I do not know personally.

Yours faithfully,
J. B. WHITE,

The Spinney,
63 Bouverie Avenue,
Salisbury.

June 6th, 1955.

Sir,—May I take this opportunity of thanking all the members of the profession who were good enough to cast their votes for me at the last R.C.V.S. Council election.

Yours faithfully,
H. M. WILSON,

134 Bonnygate,
Cupar,
Fife.

June 3rd, 1955.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period		Anthrax	Atrophic Rhinitis	Foot-and-mouth	Fowl Pest	Sheep Scab	Swine Fever
1st to 15th May, 1955		27	—	—	16	—	86
Corresponding period in	1954	20	—	—	30	—	68
	1953	28	—	—	37	—	251
	1952	44	—	86	6	—	57
1st January to 15th May, 1955		376	—	6	225	—	570
Corresponding period in	1954	126	—	12	499	—	552
	1953	378	—	25	247	—	1,269
	1952	218	—	201	106	1	455

TUBERCULOSIS (ATTESTED HERDS) SCHEMES

The number of Attested Herds, *i.e.*, herds officially certified as free from Tuberculosis as at 30th April, 1955, was as follows :—

England	Wales	Scotland	Total (Great Britain)
72,120	32,930	33,996	139,046